

FRESHWATER TRICLADS (TURBELLARIA) OF NORTH
AMERICA. XI. *PHAGOCATA HOLLERI*, NEW SPECIES,
FROM A CAVE IN NORTH CAROLINA

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Abstract.—*Phagocata holleri*, n. sp., from Mt. Jefferson Cave in Mt. Jefferson State Park, North Carolina, is described. The species resembles *P. angusta* of West Virginia by its external appearance, but differs from it conspicuously in the structure of its copulatory apparatus.

The Appalachian region of the southeastern United States contains several unpigmented (white) species of the genus *Phagocata*. Some of these species show prominent auricular projections (*P. bursaperforata* Darlington from Georgia and Alabama and at least two undescribed species from North Carolina and Tennessee), while others lack such projections or auricles and may easily be confused in the field with the more widely distributed *P. morgani* (Stevens and Boring).

Dr. Cato O. Holler, Jr. of the North Carolina Cave Survey forwarded to me several live planarians collected in a cave in Mt. Jefferson State Park, North Carolina. They proved to be a new species.

Phagocata holleri, new species

Type-material.—Holotype, whole mount of anterior end and sagittal sections of the rest of the body on 6 slides, deposited in the National Museum of Natural History, Smithsonian Institution (USNM 57139); paratypes, sagittal sections of 3 specimens on 16 slides (USNM 57140-57142).

External features (Figs. 1A, 1B).—The body is very slender, measuring at maturity up to 15 mm in length and 1 mm in width. The anterior end of the quietly gliding animal is truncate, with a straight or slightly concave frontal margin and laterally projecting rounded edges. Behind the head, the body first narrows, then gradually widens again to maintain its width close to the posterior end. The body is unpigmented, white. The head bears a pair of very small eyes, barely noticeable under the dissecting microscope (they do not show in the photograph of the specimen in Fig. 1A). They are placed close together at a mutual distance of perhaps $\frac{1}{5}$ the width of the body at the level of the eyes and are far removed from the frontal margin. The amply ramified intestine begins at or slightly behind the eyes. The pharynx is situated behind the middle of the body, its length amounting to about $\frac{1}{6}$ the



Fig. 1. *Phagocata holleri*. A, Photograph of living specimen, $\times 5.7$; B, Outline drawing of living specimen, showing location of eyes, pharynx, and copulatory complex.

body length. The copulatory complex appears in the living specimen as a transparent spot in the middle of the postpharyngeal region.

Anatomy.—Serial sections of the 4 type-specimens were used in the analysis of the anatomy. The two eyes are situated rather deep below the dorsal epithelium and are of very much reduced size, the diameters of their pigment cups measuring only 13–23 μm .

The 2 ovaries, each bearing a conspicuous parovarium, are located below or behind the fourth to sixth pair of lateral branches of the anterior intestinal trunk. The numerous rounded testes (Fig. 2) occupy a broad longitudinal band on either side of the body, extending from behind the ovaries to the region of the pharynx. They are essentially ventral, only very few of them reaching dorsally between the intestinal branches. Many testes are widely connected with the anterior part of the seminal duct or vas deferens (*vd*) that runs along the medial side of the ventral nerve cord, without forming efferent ductules. The vas deferens expands in the region of the pharynx to form the spermiductal vesicle or false seminal vesicle that proceeds caudally in a tortuous fashion to approach the bulb of the penis.

The copulatory apparatus (Fig. 3) is situated some distance behind the pharyngeal pouch. The genital aperture or gonopore (*gp*) lies about midway between the mouth opening and the tail end of the body. It leads into a small common atrium (*ac*) that connects dorsally with the duct (*bd*) of the

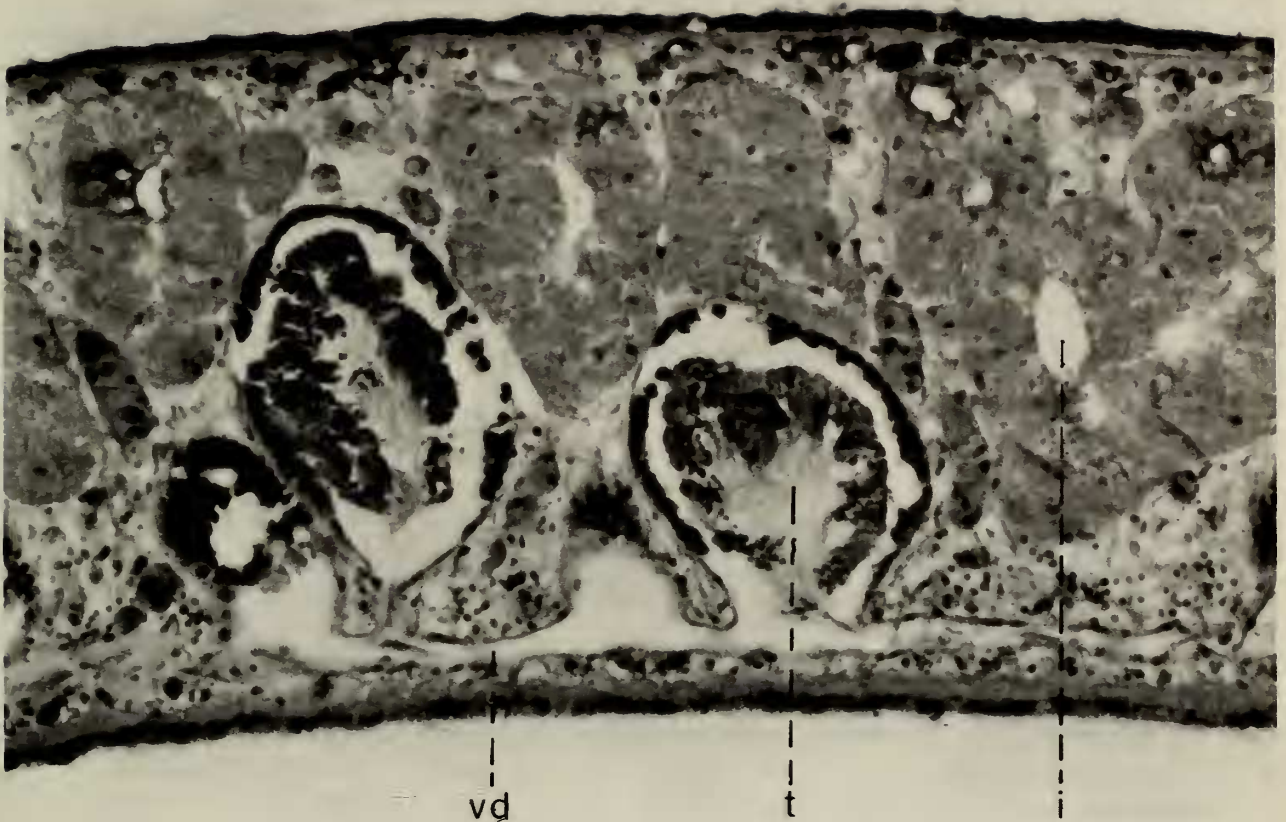


Fig. 2. *Phagocata holleri*, photomicrograph of sagittal section through region of testes. i, intestine; t, testis; vd, vas deferens.

copulatory bursa and anteriorly with the male atrium (*am*) surrounding the penial papilla. The atria are lined with a nucleate cuboidal epithelium, somewhat thicker in the common atrium than in the male atrium. The penis consists of a moderately muscular bulb (*bp*) embedded in the mesenchyme and a short, more or less conical papilla (*pp*) projecting into the male atrium. The large penial lumen (*vs*) is uniform, not divided into an anterior vesicle and a posterior duct, as is usually the case. It extends as a large cavity from the penial bulb obliquely posteroventrally, tapering toward its opening at the tip of the papilla. In all four specimens the lumen was filled with finger-shaped processes projecting from its wall. The two expanded vasa deferentia (*vd*) approach the penial bulb from the sides, proceed dorsomedially, and open separately, but close together, into the anterior part of the penial lumen.

The copulatory bursa (*b*) shows no peculiarities. Its outlet, the bursal duct (*bd*), runs posteriorly above and somewhat to the left of the penis, then curving ventrally, gradually increasing in diameter. It opens into the common genital atrium from the dorsal side. The lining of the entire duct, as well as that of the common atrium, appears to be uniform histologically, so

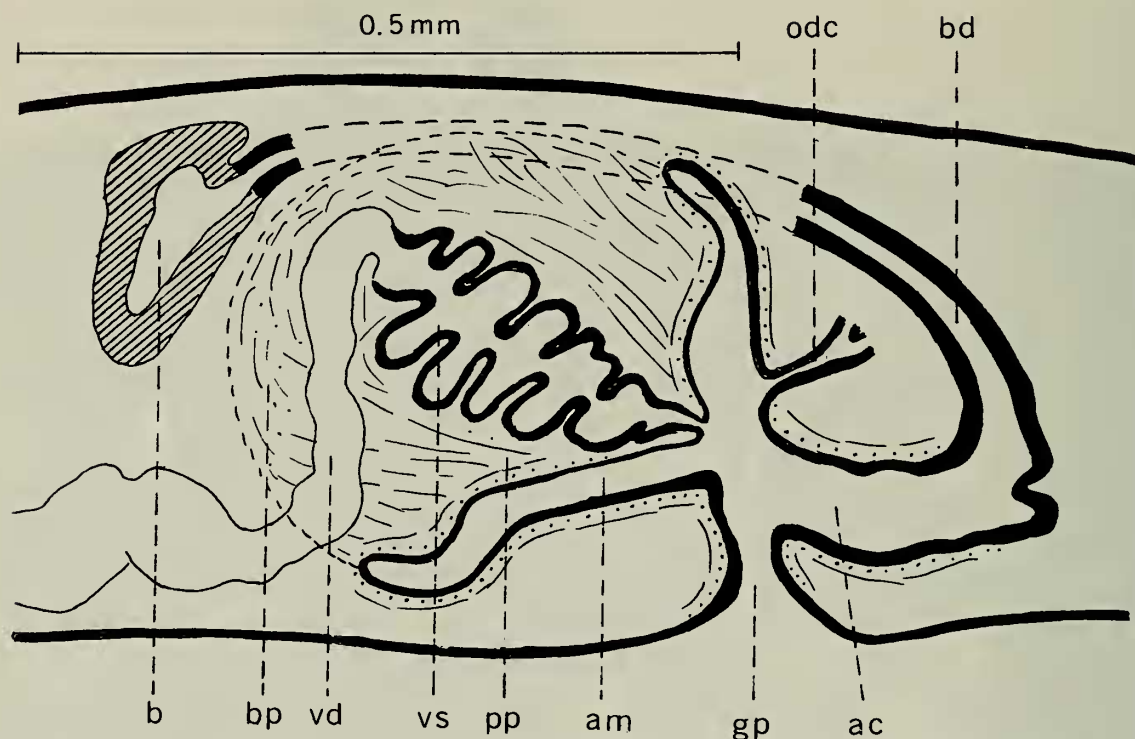


Fig. 3. *Phagocata holleri*, semidiagrammatic view of copulatory apparatus in sagittal section. ac, common atrium; am, male atrium; b, copulatory bursa; bd, bursal duct; bp, penis bulb; gp, gonopore; odc, common oviduct; pp, penis papilla; vd, vas deferens; vs, penial lumen (seminal vesicle).

that it is difficult to pinpoint the boundary between them. There is no differentiated posterior section of the bursal duct that could be considered a "vagina."

The two oviducts unite in the space between the male atrium and the bursal duct to form a common oviduct (*odc*) that opens into the male atrium near the transition between the male and common atria.

Distribution and ecology.—Five immature specimens of *Phagocata holleri* were collected by Dr. Cato O. Holler, Jr. in Mt. Jefferson Cave, located at an elevation of about 3560 feet in Mt. Jefferson State Park, Ashe County, North Carolina, on 27 May 1978. They were sent to me alive and were placed in a culture maintained at 14°C and fed pieces of beef liver at weekly intervals. At my request, Dr. Holler kindly revisited the cave in September 1978, but found that the seep, in which the original specimens were collected, had almost dried up. Two more worms, in poor physiological condition, were collected but did not survive the transportation to Washington. The specimens from the original collection, however, matured in the culture and were preserved in August, September, and November 1978. The species appears to be a true troglobite.

Taxonomic position.—Among the white species of the genus *Phagocata* occurring in the Appalachian region, *P. holleri* shows externally a remarkable similarity to *P. angusta* Kenk (1977), reported from a cave in West

Virginia. Both are characterized by having very slender bodies, truncated heads lacking prominent auricular appendages, the anterior end being somewhat more flared in *P. holleri* than in *P. angusta*. Both species have extremely small eyes located at a considerable distance from the frontal margin. Anatomically, the two species coincide in having ventral testes confined to the prepharyngeal region. In the structure of the copulatory complex, however, they show several conspicuous differences. The configuration of the penis of *P. holleri*, with its large villous lumen, is unique among the species of the genus. Other differences concern the histology of the bursal duct.

The species is named in honor of its collector, Dr. Cato O. Holler, Jr. of Old Fort, North Carolina.

Literature Cited

- Kenk, R. 1977. Freshwater triclads (Turbellaria) of North America. X. Three new species of *Phagocata* from the eastern United States.—Proc. Biol. Soc. Washington, 89:645–652.

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